App. F. IX-4

Previous References. 1942-3 (War)

W File No. 210-42
Serial Nos. 1 to 19.

Later References.
W 204-43-182.

GENERAL AND REVENUE SECRETARIAT

Serial Nos. Nineteen only.

Part B for September 1943.

SUBJECT

Bomb disposal organisation —
(Unexploded Bombs.)

R. Krishnan
24.9.43.

2928/W. 3010/W. Bomb Disposal Organisation Unexploded Bombs.

Continuation Sheet. File No. W Current No. 210 of 42-3. Page:

Sl. 1. From The Secy to the Hon'ble the Resident F. 3(24) 42/W dated 8th April 43 forwarding copy of CD Deptt Circular dated 30th March 43 and annexure thereto dated 2nd March 43.

Forwarded for perusal with a draft to the Govt of India in continuation. The Govt has been issuing amendments, and who received to the pamphlet on Bomb Disposal Organisation

RS 12/4

Sl. 2. Issued 3908/W dated 13th April 43 to the Govt of India.

3. From The Secy to the Hon'ble the Resident. F. 3(24) 42/W dated 15th April 43 forwarding CD Deptt Circular dated 3rd Feby 43.

Forwarded for perusal. A copy of the Circular will be sent to the Govt of India in continuation

RS 19/4

for Secretary

Govt of India

Min Edn)

9403 20 APR 43

24/4

19/4

22/4/43

24/4/43

2/4 19/4

Issued 4088/W Enclosure dated 28.4.43 to the I.G.P.

3450/W 3099/W 3170/W Incendiary bombs.

Continuation Sheet. File No. / Current No. 2-10 of 351/W 12 Page.

5 Issued No 7 3(24) - 42/W. dy 30-4-43 from Resy forwarding copy & Dft of letter dy 20-2-43.

~~Forwarded~~ Sent with a draft letter to D. of Sy. & Communicating the above in continuation

SC 3/5/43.

TYPING SEC - 3 MAY 1943 GEN. & REV. SECTT.

6 Issued 4205/W dated 4-5-43 to CSP

B8* From The Secy to the Admlty the War Office F. 3(24) 42/W d 12th Jan. 40 forwg copy of CD Draft circular 476/40 d 13th Dec. 40 re: Unexploded Bombs.

Admlty for perusal. The original circular will be sent to the USP in connection for Naval action

RS 14/6 SC Admlty with a letter to the USP. 14/6

RS 16/6 SC (9) Issued 4620/W d 16th Jan. 40 to the USP.

From The USP.

(10) MEP 20/41-42 d 18th Jan. 40 requesting that a draft first Press may be submitted and supply 200 copies of the Note for distribution to all Concerned

Admlty with a draft to the Admlty with memo to the USP. as requested

RS 21/6 SC 21/6

(11) Issued 4492/W d 22nd Jan. 40 to the Admlty 4493/W Memo USP

2.80 1411 W. Unexploded Bombs.

Continuation Sheet. War File No. 210-42 of 1942-43 Page

(12). No F 3 (24)-42/W dt 30-7-43 from Secy forwarding circular No 594/43 A, & 197/43 dt C.D. Dept re unexploded bombs for necessary action.

Sd
4/16.

(13). Issued. no. D. 197/d. 5-8-43. to the I.G.P. fg copy of Govt of India Circular. no. 594/43 dt 8.7.43

(14). Letter No ARP 30/41-42 dated 30th August 1943 from the I. G. P. requesting that the Supdt, Govt Press may be authorised to print & supply 300 copies of C. D. Dept circular dt 8.7.43 re: unexploded bombs

Subd with a draft letter to the Supdt, Govt Printing for approval.

13.8.43.
Sd

(15) Issued. no. D. 296/dt. 13-8-43 to Supdt. Govt. Printing. & memo. D 297 to I.G.P.

to print 300 Copies.

(16) Letter No F3(24)-42/W dt 18.8.43 from the Secy to the Hon'ble the Resident fdng for information copy of the proceedings of the Madras Govt dt 2.11.42 together with the amendments issued thereto re: arrangement made by the Madras Govt for disposal of unexploded bombs

Subd with a draft letter to the I.G.P. fdng the said proceedings & the amendments in continuation

of the previous letter.

21.8.43.

14 Issue 384/W & 23rd Aug. to all SP.

18. Ref ... The Secy to the Hub & Rural Fr. 3(24) 42/W and 27th Aug. to forward a CD Dept circular No 599 - Amendment to their circular 594/40 & 6th Sept. 40 re: Unexploded Bombs.

The CD Dept circular & 8th Sept. 43 was sent to all SP. for Necessary action & the present reply is an amendment to the above circular. A copy of the present circular will be sent to all SP for Confidential information

19/8 Issued No. W 450 dt 31.8.43 to the I.G.P. forwarding copy of C.D. Dept circular No 599 on the above subject

2928 W 210-42-1.

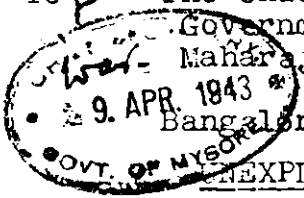
SECRET.

Pol. 2057

No.F.3(24)-42/

From - The Secretary to the Hon'ble the Resident in Mysore.

To - The Chief Secretary to the Government of His Highness the Maharaja of Mysore, Bangalore.



Bangalore, the 8 April 1943.

UNEXPLODED BOMBS.

Sir,

I am directed to refer to letter from this Residency No.F.3(24)-42/W, dated the 24th April 1942, and to forward a printed copy of the Government of India (Civil Defence Department) circular No.143/42, dated the 30th March 1942, amended upto 2nd March 1943. A copy of the (Civil Defence Department) circular No.444/42 referred to in it was forwarded to you with letter from this Residency No.F.3(24)-42/W, dated the 18th January 1943

I have the honour to be,
Sir,
Your most obedient servant,

SECRETARY TO THE RESIDENT.

Appendix F. G.—1]

SUBJECT.....

.....

.....

Section War

File No. 210-42

Serial No. 2.

Diary No. of letter replied to 2928

No. 3938/W Enclose Copy of Civil Defence Dept. Circular No 163/42 d 30-3-43

To The DSP.
Unexploded Bombs.

General and Revenue Secretariat

( )

the *194* .

Date of issue 13-4-43

Signed by... W. Akv

Sir, I am directed to enclose herewith a copy of this office letter No 2700/W d 27th April 42 on the above subject and to enclose herewith a similar copy with Govt of India CD Dept circular No 143/42 d 30th March 43, amended upto 2nd March 43, since received from the Residency. A copy of the CD Dept circular No 444/42 referred to in it was forwarded to you with this office letter No 3220/W d 22nd Jan 43 for receipt instructions to be

List of enclosures.....

Copied by.....

Examined by.....

issues to the Concerned offices.

I have the
for 12/4/13
Chief Engineer (Projects)

W 210-42-3.

SECRET.

No.F.3(24)-42/W.(1 enc) 3010

From

The Secretary to the Hon'ble the Resident in Mysore.,

To

The Chief Secretary to the Government of His Highness the Maharaja of Mysore, Bangalore.

Bangalore 15 April 1943.

Examination of Enemy Unexploded Chemical Warfare Bombs.

Sir,

In continuation of my letter No.F.3(24)-42/W, dated the 8th April 1943, I am directed to forward for information a copy of the Government of India (Civil Defence Department) secret circular No.500/43, dated the 3rd February 1943.

I have the honour to be,
Sir,
Your most obedient servant,

CHIEF SECRETARY 18 APR 43 OUT OF MYSORE

SECRETARY TO THE RESIDENT

MAI

SECRET.

No.159/42-ARP.II.
Government of India.
Civil Defence Department.
New Delhi, the 3rd February 1943.

From

R.A. Gopalaswami, Esquire, I.C.S.,
Deputy Secretary to the Government of India.

To

All Provincial Governments and
Chief Commissioners.

CIVIL DEFENCE DEPARTMENT CIRCULAR NO.500/43.

Subject:- Examination of Enemy Unexploded Chemical Warfare Bomb (U.X. Gas).

Sir,

I am directed to refer to this Department's Circular letter No.143/42 dated the 30th March 1942 regarding the disposal of Unexploded Bombs and to say that it is very important that the earliest possible information of the types of gas being used by the enemy should be obtained by the military authorities and Provincial Governments in the event of chemical warfare being started. This is best obtained from the examination of unexploded gas bombs and their contents, and it is one of the duties of Technical Officers (C.W.) who are posted to the Headquarters of Armies, Commands and Corps to examine such bombs, in cooperation with Bomb Disposal Sections, and after the bomb has been rendered safe, to take a sample from it, and/or send it away for further examination, as he considers necessary.

2. Whilst U.X. Gas Bombs should be given a high priority of disposal for Intelligence purposes, it would be unwise to place them in category 'A' solely because they were unexploded or suspected unexploded gas bombs. In addition, it would be difficult for Bombs Reconnaissance Parties to distinguish between Unburied, Unexploded H.E. and Gas Bombs, and practically impossible in the case of Buried Bombs. It would be necessary to suspect all U.X.B. in an area subjected to a gas attack as U.X. Gas unless there is direct evidence to the contrary. It has been decided, therefore, that irrespective of the fact that certain bombs are suspected of being gas bombs, priority of disposal should continue to be decided as set out in paragraph 9, Appendix B of Circular 143/42 under reference, and that within category 'A' U.X.B. should be dealt with in the order decided upon by the Provincial Government. U.X. Gas you should however, head the list in each of the categories B, C and D and should be disposed of before any other bombs listed in the same category. Against U.X.B. in any category should be written "Suspected U.X. Gas". It should be understood that this does not alter the fact that all bombs in higher category will be disposed of before those in a lower category.

3. It may happen, however, that there are U.X.B. in two places a considerable distant part, and that the O.C. Bombs Disposal Company may consider that time will be saved by dealing with bombs of all categories in the one area before proceeding to the other; if so, it is open to him to represent the fact to the Provincial Govt. you concerned whose decision will be final. If it is so decided, the bombs in the area in which they are suspected, U.X. Gas should be disposed of first.

4. When U.X.B. (Suspected U.X. Gas) are on the list for disposal given to the Bomb Disposal Company Commander, a copy should be given to the Military Liaison Officer, if any, otherwise it should be sent by the quickest means possible to the Army/Command or Corps Headquarters nearest to the incident for the information of the Technical Officer (C.W.)

5.....

5. When U.X. Gas are being disposed of, the Gas Identification Officer should, if possible, be present to undertake the following:-

(a) As an expert representative of the Civil Defence Organisation to assist in connection with precautions for the safety of the nearby population.

(b) To receive samples from the Bomb Disposal Section for further examination by the Chemical Adviser to the Provincial Government. If the Technical Officer (C.W.) you is not present, the duplicate samples should be sent to him by the Gas Identification Officer as soon as possible. Gas Identification Officers should not attempt themselves to take samples from a U.X. Gas Bomb but should ask the O.C. Bomb Disposal Section to obtain them for him.

(c) In the case of a Leaking Gas Bomb, Gas Identification Officers should carry out preliminary tests and take samples for submission to the Chemical Adviser.

6. It is requested that arrangements be made for close liaison between the Chemical Adviser and the Technical Officers (C.W.) at Army/Command or Corps Headquarters within the Province.

I have the honour to be,
Sir,
Your most obedient servant,

Deputy Secretary to the Government of India.

No.159/42-ARP.II.

A copy is forwarded to all Departments of the Government of India, Air Headquarters, E-in-C's Branch, Naval Headquarters, the Chief Secretary to the Government of Ceylon, Area Advisers, Commandants of Civil Defence Schools, General Headquarters (G.S. Branch, S.D. Signals), General Headquarters (G.S. Branch, M.O.3), General Headquarters (G.S. Branch,(G.S.I.T), General Headquarters (G.S. Branch, S.D. Air), Air Headquarters (Air Intell. Section), Air Headquarters (Armt. 5, Flight-Lt. Uphill) and Headquarters 10th U.S. Air Force (Major Wildrick) for information.

By order,

Deputy Secretary to the Government of India.

S.S.C.
150/2/2.43. D

Appendix F. G.—1]

SUBJECT.....

.....

.....

Section War

File No. 210-42

Serial No. 4.

Diary No. of letter replied to....3010.....

Secret

No. 4088/W. dated 28-4-1943

Encl: one.

To The I.G.P.

General and Revenue Secretariat

( )

the *194* .

Examination of Enemy Exploded Chemical Warfare Bombs.

Sir,

Date of issue.... 28-4-1943 ....

In continuation of this office letter No 3938/W dated 13th April. 43 I am directed to forward for information a copy of the Govt of India CD Dept circular No 500/40 dated 3rd Feb. 43 on the above subject.

Signed by... Mr SKV .....

I have the

honour to be

Sir

Your obedient Servant

for Chief Secretary to Govt

List of enclosures.....

Copied by.....

Examined by.....

WD 04161—GPB—60,000—24-10-41

SECRET.

No.159/42-A.R.P. II.
Government of India,
Civil Defence Department,
New Delhi, the 20th February 1943.

From

S.A. Iyengar, Esquire, I.C.S.,
Under Secretary to the Government of India.

To

All Provincial Governments
Chief Commissioners.

CIVIL DEFENCE DEPARTMENT CIRCULAR No.525/43.

Subject:- Examination of Enemy Unexploded Chemical Warfare Bombs (U.X.Gas).

Sir,

I am directed to invite a reference to this Department letter No.159/42-A.R.P. II., dated the 3rd February 1943, (Civil Defence Department Circular No.500/43), and to say that the following amendments should be made therein:-

Para. 2, last sentence: Insert the article 'a' before the word 'higher'.

Para. 3, second line: Read 'Bomb Disposal' for 'Bombs Disposal'

Para.3, last sentence: Read 'there' for the word 'they', and omit coma after the word 'suspected'

P.T.O.

Para. 5, (b), Second sentence: Omit the article 'the' before the word 'duplicate', and read 'Samples' for 'Sample'.

I have the honour to be,
Sir,
Your most obedient servant,
Sd. S.A. Iyengar.
Under Secretary to the Govt. of India.

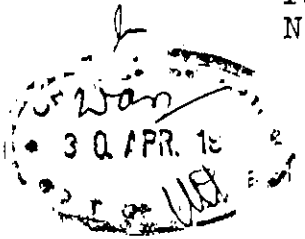
-------:ooooo:-------

OFFICE OF THE HON'BLE THE RESIDENT IN MYSORE.

Bangalore 30 April 1943.

No.F.3(24)-42/W.

Copy forwarded to the
Chief Secretary to the Government of His Highness the Maharaja of Mysore,
Bangalore.
for information, in continuation of letter from this Residency No.F.3(24)-42/W, dated the 15th April 1943.



By order, etc.,

for SECRETARY TO THE RESIDENT.

MAP.

Appendix F. G.—1]

SUBJECT.....

.....

.....

Secret.

Section War

File No. 210-42

Serial No. 6.

Diary No. of letter replied to 3099/W.

No. 4205/W dated 4-5-1943

To

The I. G. P.

General and Revenue Secretariat

( )

the *194* .

Sir,

Date of issue.... 4-5-1943

Examination of Enemy Unexploded Chemical Warfare Bombs (U. X. Gas)

Signed by.... Mr. SKV

In continuation of this office letter No. 4088/W of 28-4-43, I am directed to forward for information a copy of the Govt of India C. D. Dept circular No. 525/43 of 20-2-43 on the above subject.

I have etc.,

(Vide P.U.D.)

List of enclosures.....

Copied by.....

Examined by.....

for Chief Secy to Govt.

WD 04161—GPB—60,000—24-10-41

C. F. No. 46] 3170/W W210-42-9.

GOVERNMENT OF MYSORE

Tele gram / phone

OFFICE OF

the Inspector-General of Police

in Mysore,

Bangalore.

No. ARD. 30/41-42.
Encls. one.

Date May 6, 1943.

To 8. The Chief Secretary

to the Government of Mysore,

Bangalore.

Sir,

List of crrections to the pamphlet on Bomb Disposal Organisation.

With reference to your letter No.3938/W dated the 13th April 1943, I have the honour to enclose a list of corrections issued to the pamphlet on Bomb Disposal Organisation. This has reference to the enclosure received with your letter noted above.

I have the honour to be,
Sir,
Your most obedient servant,

Subd for perusal.
8.5.43.

for INSPECTOR GENERAL OF POLICE.
on leave.

LIST OF CORRECTIONS TO THE PAMPHLET ON BOMB DISPOSAL ORGANISATION.

Page . Para (c)

Add the following after the word Headquarters in line 5.

In the case of U.X.B. dealt with by the R.A.F., R.A.F., or U.S.A. Air Force the nearest Commander of the Air Force concerned should be consulted before a final decision is reached. See also (c) below re the revised instructions on Crashed or Force Landed Aircraft.

Para 5 (c).

Delete "Military Authorities" in line 2 and add the following -

Army except in the following circumstances when it lies with the Air Forces in order:-

(i) When the U.X.B. are on British or U.S.A. Air Force property.

(ii) U.X.B. carried by or associated with crashed or force landed friendly or enemy aircraft.

(iii) Jettisoned British or American bombs being found in any area.

If Air Force personnel are not available, the Provincial Government or Resident concerned will be informed and will then take action as per para 8(b)(ii) of the revised instructions on Crashed or Force Landed Aircraft."

Page 3.

The following new para may be added after paragraph 4.

4A. The procedure to be adopted in the case of crashed aircraft is the subject of the revised instructions on Crashed or Force Landed Aircraft.

Page 3.

Appendix "B" - para 2.

Insert the following after the word Centre in line 4.

or, if found in a place which has not been constituted as U.X.B. area, to the District Magistrate. The District Magistrate or".

Substitute small letter for big letter T in the word "The" in the next sentence.

Page 4. End of para 5.

Read "paras 13 and 14(iii) below" for "para 13 etc.".

Action by the U.X.B. Controller when the Presence of Unexploded Bombs is confirmed, or Strongly Suspected.

In the above heading - read "strongly" instead of the word "stongly".

Page 5.

Para 7(b)(i). Insert "Type (if possible)" above the word "Location".

Para 10 - line 2.

Read - 'must' for the word 'most'.

Para 10 - number the existing paragraph as 10(a) and add the following fresh paragraphs (b), (c) and (d).

(b) Only bombs in Category A will be dealt with immediately. Bombs in Categories B, C and D, will not be dealt with until 200 hours have elapsed unless the Bomb Disposal Officer is reasonably certain that it is not a time bomb.

(c) U.X.B.'s carried by or associated with crashed aircraft will not be placed in Category A.

(d) It may often be the case that a U.X.B. placed in Category A, as being likely to cause damage vitally affecting the war effort, would not cause such damage if it were properly screened by sandbag walling or other device and could then be placed in a lower Category. When deciding priority, a Bomb Disposal Officer or other technically qualified person, if possible, should always be consulted. Protective screening should be carried out under the supervision of a B.D.Officer or other technically qualified person, by Civil Defence Workers who volunteer for the purpose or who are ordered to do so by the A.R.P.Controller. Only A.R.P.Controllers may give orders to Civil Defence Workers to undertake this duty.

Page 6. - Form of Card.

After serial 1, insert the following as 2 and 3, and renumber the rest.

2. "Type of Bomb (if possible).
3. Exact location of bomb."

Page 11. Serial 8.

Insert the following as (i) and renumber the rest as (ii) and (iii).

"(i) Type of Bomb (if possible)."

Page 12. - Appendix D.

Substitute the following for the existing para 2 - from sub-paras (a) to (f), and call sub-paras (f) and (g) as (iii)(a) and (b) respectively.

"The definition of an "unburied bomb" is a bomb which is lying on the surface or some part of the bomb is visible.

For unburied bombs the following precautions must be taken prior to reconnaissance by an officer of the Bomb Disposal Unit:-

(i) In the unlikely event of a bomb of 1,800 kg. or larger lying unexploded on the surface, the precautions to be taken will be based, as regards safety distances, on those applicable to a parachute mine and will be as follows:-

(a) Initial Evacuation.- All buildings including industrial premises within 200 yards of the bomb must be evacuated. Rooms must be vacated up to 400 yards from the bomb site if they have either exposed doors or windows unscreened from the bomb site by intervening buildings, or if screened from the bomb site only by flimsy constructions such as walls of asbestos-cement or corrugated-iron sheeting, lath and plaster partitions, etc.

Page 3 of the list of corrections to the pamphlet on Bomb Disposal Organisation.

Add the following as 2(ii)(c) - in the above copy.

Traffic Restrictions:- No vehicular traffic and no pedestrian traffic othern than person requiring access to the unevacuated houses within the area should be allowed within 300 yards of the bomb unless screened by intervening buildings or brick walls. If so screened, the distance may be reduced to 100 yards for bombs over 250 kg. and to 50 yards for bombs of 250 kg. or less.

(b) Windows:- Windows within 800 yards of the bomb should be opened wide.

(c) Traffic.- No vehicular traffic and no pedestrian traffic (other than persons requiring access to the unevacuated houses within the area) should be allowed within 300 yards of the bomb unless screened by intervening buildings or brick walls. If so screened, the distance may be reduced to 200 yards.

(ii) In the case of all other unburied bombs the precautions to be taken prior to reconnaissance by an officer of the Bomb Disposal Unit will be as follows:-

(a) Initial Evacuation.- All buildings should be cleared up to 500 yards for bombs up to 250 kg. and up to 100 yards for bombs over that size. Rooms must be ~~exxcuxtedx~~ vacated up to 150 yards for bombs up to 250 kg. if they have either exposed doors or windows unscreened from the bomb site by intervening buildings, or if screened from the bomb site only by flimsy constructions such as walls of asbestos-cement or corrugated iron sheeting, lath and plaster partitions, etc.

(b) Opening of windows.- Windows should be opened wide in rooms referred to in sub-para (a) above, and preferably to rather greater distance."

(c) Traffic Restrictions.- (please see separate slip). Pages 12 and 13.

Substitute the following for the existing para 3 of Appendix-D.

"3. Buried Bombs - Areas to be cleared.

(a) The definition of a "Buried Bomb" is a bomb which is neither lying on the surface nor any part of the bomb is visible.

(b) For buried bombs the following precautions must be taken prior to reconnaissance by an officer of the Bomb Disposal Unit:-

(i) Initial Evacuation.- All buildings within 50 yards of the bomb should be cleared. In unevacuated houses within 100 yards of the bomb the rooms on the same side of the building as the bomb should not be used.

(ii) Opening of Windows.- In order to reduce the risk of injury from glass, all windows in the walls of buildings on the same side as, and within a 100 yards of the bomb should be opened wide.

(iii) Traffic Restrictions.- No vehicular or pedestrian traffic should be allowed within 50 yards of the bomb. Between 50 yards and 100 yards of the bomb, traffic should be confined to persons or vehicles requiring access to the unevacuated houses, which should be entered by a door on the side of the building remote from the bomb.

(c) The following relaxations may subsequently be made in the case of buried bombs:-

(i) All safety precautions may be relaxed and occupants may return to their houses 200 hours after a bomb falls unless a railway, including an underground railway, passes within 50 yards of the bomb, in which case full restrictions must be maintained until the bomb is finally disposed of. Wheeled traffic (other than bicycles) must, however, not be allowed on roads within 50 yards of the bomb until it is finally disposed of.

(ii) The following immediate relaxations may be permitted

permitted where a buried bomb can be certified by an Army Engineer Bomb Disposal Officer, as of 50 kg. :-

(a) Evacuation.- The measure of relaxation of safety precautions will vary with circumstances; but it should be possible to allow the immediate reoccupation of all houses except those within 10 yards.

(b) Windows.- Where persons are allowed to return to their houses, windows need no longer be kept open.

(c) Traffic.- Traffic may be allowed to pass unless the bomb is within 10 yards of the road.

In the case of unburied bombs none of the safety precautions must be relaxed until the bomb is rendered safe."

Delete diagrams opposite the page 14.

Page 15.

Para 9(d) - line 2. Read 'no train' for the wrds. 'not rain'.

Page 17.

For '(Fig.5)' at the end of sub-para 4(b)(ii), read '(Fig.4)'.

Page 18.

Paragraph 1(i) - Read 'component' for the word 'camponent' in line 5.

Memo No.ARP.30/41-42.

Office of the
I.G. of Police in Mysore,
Bangalore, Dated May 1, 1943.

Copies to all recepients of the pamphlet on 'Bomb Disposal Organisation'.

For Inspector-General of Police.

W210 42-8 SECRET.

OFFICE OF THE HON'BLE THE RESIDENT IN MYSORE.

Bangalore 12th June 1943. 3450 W

No.F.3(24)-42/W. Ex/

A copy of the undermentioned papers is forwarded to the Chief Secretary to the Government of His Highness the Maharaja of Mysore, Bangalore

War

CHIEF SECRETARY

for information, in continuation of letter from this Residency No.F.3(24)-42/W, dated the 8th April 1943.

2. Paragraph 10(d) of Appendix B to Civil Defence Department Circular No.143/42, dated the 30th March 1942 as inserted by item 7 of the amendments forwarded with Civil Defence Department circular No.445/42, dated the 17th December 1942 is incorporated in the printed copy of Circular No. 143/42, forwarded with letter from this Residency referred to above.

By order, etc.,

for SECRETARY TO THE RESIDENT.

- - - - -

The

The Government of India (Civil Defence Department) Circular No.476/43, dated the 13th January 1943, and enclosure.

MAP.

GOVERNMENT OF HIS HIGHNESS THE MAHARAJA OF MYSORE.

***

No. 4430/W.: Encl one circular/ General & Revenue Secretariat
Bangalore, 16th June 1943.

W.210-42-9.

From

The Chief Secretary to the Government of His Highness the Maharaja of Mysore.

To

The Inspector General of Police in Mysore,
Bangalore.

Sir,

Unexploded bombs.

I am directed to invite reference to this office letter No.3938/W. dated the 13th April 1943 on the above subject and to enclose herein a copy of Residency letter dated 12th June 1943 with its enclosure for needful action.

I have the honour to be
Sir,
Your most obedient servant,

For Chief Secretary to Government

Sd/-

Copy of Residency letter No.F.3(24)-42/W. dated the 12th June 1943.

A copy of the undermentioned papers is forwarded to the Chief Secretary to the Government of His Highness the Maharaja of Mysore, Bangalore.

2. Paragraph 10(d) of Appendix B to Civil Defence Department Circular No.143/42, dated the 30th March 1942 as inserted by item 7 of the amendments forwarded with Civil Defence Department circular No.445/42, dated P.T.O

the 17th December 1942 is incorporated in the printed copy of Circular No.143/42, forwarded with letter from this Residency referred to above.

"Copy"

C. F. No. 46]

GOVERNMENT OF MYSORE

3511/W.

Telegram / phone

W.210-42-10 OFFICE OF

the Inspector-General of Police

No. ARP.30/41-42.
Encls.

in Mysore,

Bangalore.

Date June 18, 1943.

To

The Chief Secretary

to the Government of Mysore,

Bangalore.

Sir,

UNEXPLODED BOMBS.

With reference to your letter No.4430/W dated the 16th June 1943, I have the honour to request that the Superintendent, Government Press, may kindly be authorised to print and supply me 300 copies of the Notes on Protective Works received with your letter above, for distribution to all concerned.

I have the honour to be,
Sir,
Your most obedient servant,

INSPECTOR GENERAL OF POLICE.

Appendix F. G.—1]

SUBJECT.....

.....

.....

Section War

File No. 210-43

Serial No. 11.

Diary No. of letter replied to.....

No. 4492/W.

To The Supdt
Govt Printing.

General and Revenue Secretariat

( )

the *194* .

Date of issue.... 22.6.43.

Signed by.... Dr. S.K.V. .....

Sir, I am directed to request you
kindly to print and supply
300 copies of the Rules on
Protective works in the Republica
which will send you the printing
matter direct.

I have the
honour
to be
Sir
Your most obedient
servant
for Chief Secretary to Govt.

List of enclosures.....

Copied by.....

Examined by.....

Memo. No. 4493/W.
Copy to J. Cy. P with
reference to his letter
No A.R.P. 3-1/43/2
dy 18-6-43.

chief Secty. to Govt

War

2 8. JUL. 19-
GOVT. OF MADRAS

PROTECTIVE WORK.

No. A. R. P. 30—41-42, *dated* 18*th June* 1943.

A.—GENERAL.

1. Unexploded bombs may fall in places where their explosion would cause great damage to buildings, fortifications or installations Such bombs cannot always be dealt with at once by bomb disposal units, but certain precautionary measures can be taken immediately the bombs fall with a view to minimizing the damage should explosion take place. These measures consist of :—

(i) Preventive trenching, to minimise damage to foundations, buried pipes, etc.

(ii) Packing basements with sandbags.

(iii) Sandbag walling.

(iv) Digging down to bomb to form vent (as stated in Sec. F, this should only be done under expert supervision).

In this connection it is necessary carefully to note and mark the path of thebomb as the digging proceeds.

In digging down to a bomb, great care must be taken not to move it, strike it, or subject it to a vibration. The final uncovering of the bomb should be left to the bomb disposal unit, unless it is intended to destroy *in situ*.

2. Although unexploded bombs include both "duds" and time bombs, it must be assumed that every buried bomb may be fitted with a time fuze.

As statistics of German bombs, in England, show that about 8.5 per cent only of all unexploded bombs are self-detonating, the average risk of accident to any one man working continuously for eight hours near buried bomb is about one in a hundred and twenty.

As Japanese Delay Action bombs are set for longer periods the risk, in this country, is reduced to possibly one in two hundred.

In view of this risk, work over or near any unexploded bomb should not be started until 200 hours after it has fallen unless the probable damage due to an explosion *in situ* would appreciably retard the war effort. When it is essential to start work at once, only the minimum number of men required to carry it out should be allowed in the danger area at any one time.

3. Protective sandbagging requires large numbers of sandbags. It is wasteful to keep many sandbags ready filled owing to their tendency to rot; but about 3,000 might well be kept ready under cover in A.R.P. or in other suitable depots and the remainder filled as required.

Alternatively free sand may be brought up in lorries.

Some of the methods advocated below involve estimating the depth of the bomb. This should be done as soon as possible, before the hole has caved in. If the hole has caved in, it should be possible by probing with flexible rods (such as drain rods) to assess whether the depth is over or under 10 ft.

B.—PROTECTIVE TRENCHES.

Table I shows the distances within which pipes, cables, foundations, etc., are liable to damage from explosion of a buried bomb.

TABLE I.—DISTANCES WITHIN WHICH DAMAGE IS LIABLE TO BE DONE.

Bomb	Cast-iron main, concrete or earthenware sewers	Brick sewers	Electric cables, steel pipes	Foundations and buildings
50-kg.	50 ft.	25 ft.	15 ft.	50 ft.
250-kg.	90 ft.	45 ft.	30 ft.	100 ft.
500-kg.	120 ft.	60 ft.	40 ft.	150 ft.

If a buried bomb is within the above distances of vulnerable objects, damage can be minimized by digging a trench about 2 ft. wide, 2 ft. deeper than, and as near possible to, the object to be protected. Thus, a cast-iron pipe (Fig. 1) buried 4 ft. below surface 60 ft. from a 250-kg. bomb buried 15 ft., would be protected by a trench 6 ft. deep. Such trenches need only be of the minimum width required for excavation.

Owing to the size of the crater made by explosion of the bomb, no protection could be given by a trench within 10 ft. of a 50-kg.; 20 ft. of a 250-kg. bomb and 30 ft. of a 500-kg. bomb.

C.—SANDBAG ABUTMENTS.

1. The packing of basements, cellars, etc., with sandbags to avoid damage to foundations and walls may be useful in cases where the bomb is so near the building or the foundations are so deep that the depth of the protective trench required would be prohibitive.

The method consists of packing sandbags into the internal space against the outer wall so as to support it against the explosion (Fig. 2). It is not possible to lay down the depth (d) to which sandbags behind the wall should extend, but generally speaking the tighter they are packed, and the deeper the pile, the more effective will be the support. In practice a depth of 10 ft. will probably be effective, but the sandbags should not extend as far as an internal weight-carrying wall, as the latter might be damaged by thrust due to explosion.

2. Another method of minimizing damage to foundations is given in Sec. F which in certain cases, can with advantage be combined with the above method.

D.—SANDBAG WALLS.

1. The building of sandbag walls to minimize damage from splinters, blast, etc., is applicable in the case of a bomb buried or on the surface close to a building. It may also be used to isolate the effects of a bomb inside a building.

The basic principle is that the sandbag wall must be built just outside the crater which would be formed if the buried bomb exploded. For practical purposes suitable radii from the hole of entry are shown in Table II—

TABLE II.

10 ft. from a 50-kg. bomb
20 ft. from a 250-kg. bomb
30 ft. from a 500-kg. bomb
} These figures make an allowance for the fact that the path of a bomb in earth is not straight.

2. The circumstances in which it is desirable to build a sandbag wall are as follows:—

(i) Bombs falling in open ground usually penetrate at least to the depth given in Table III. In such cases there are no serious splinter effects, and there should be no danger due to falling debris outside the area given in Table III.

The effect of blast, however, may still be very serious, and can be deflected upwards by a sandbag wall built ouside the crater area. (Table II).

TABLE III.

Size of bomb	Depth of penetration	Area to which dangerous debris is confined
50-kg.	10 ft.	Circle 30 ft. radius from bomb
250-kg.	15 ft.	Circle 50 ft. radius from bomb
500-kg.	20 ft.	Circle 75 ft. radius from bomb

(ii) At distances greater than those given for foundations in Table I, little or no structural damage to buildings is to be expected from a buried bomb.

In the case of an unburied bomb, damage will be limited to windows and roof if a sandbag wall is provided.

3. The following points should be noted in the construction of sandbag walls :—

(i) Walls should invariably be 2 ft. 6 in. thick at the top and preferably 10 ft. high. Open faces should be sloped at 1.6. This involves a base wider than 2 ft. 6 in. (say, 4 ft. 2 in.).

(ii) Walls must not be built nearer to the bomb than the distances given in Table II.

E.—SANDBAG MOUNDS.

1. If bombs bury themselves sufficiently deeply before exploding, they form an underground cavity or camouflet and no crater.

In the case of bombs buried less deeply which would otherwise form a crater on exploding, the addition of a mound of sand or earth over the crater area will produce the same camouflet effect.

This method aims at driving the explosion underground. It has effect increasing possible damage to pipes, foundation, etc., but in situations where the added earth shock can be accepted, this method may prove useful.

This method is applicable both to neutralize the effect above ground of buried bombs and to mask splinters from "unburied" bombs.

2. Buried bombs.

The weight of sand and number of sandbags required entirely to neutralize a bomb buried 10 ft. is :—

TABLE IV.

Bomb	Soil	Weight	No. of Sandbags	Arranged in cones
50-kg.	Clay	40 tons	1,600	20-ft. diameter, 6-ft. high.
50-kg.	Sand	60 tons	2,400	24-ft. diameter, 6-ft. high.
250-kg.	Clay	125 tons	5,000	40-ft. diameter, 6-ft. high.
250-kg.	Sand	180 tons	7,200	40-ft. diameter, 9-ft., high.
500-kg.	....	270 tons (Prohibitive)	10,800	....

Smaller amounts than the above will reduce the damage, but less than two-thirds of the amounts shown in the table are not worth the labour entailed.

It can be assumed that if the bomb falls in open ground or through a hard floor not exceeding 6 in. thick, the bomb will be at least 10 ft. deep and possibly more.

If the bomb is deeper than 10 ft., the weight of covering required is less. In the absence of proof of depth, however, no reduction should be accepted.

3. Unburied bombs.

The weight of sand and number of sandbags required to eliminate dangerous splinters are given below :—

TABLE V.

Bomb	Soil	Weight	No. of Sandbags	Arranged in cones
50-kg.	Clay	40 tons.	1,600	20-ft. diameter, 6-ft. high.
50-kg.	Sand	40 tons.	1,600	
250-kg.	Clay	90 tons.	3,600	40-ft. diameter, up to 6-ft. high
250-kg.	Sand	90 tons.	3,600	

F.—VENTS TO REDUCE AND DIRECT THE FORCE OF EXPLOSION OF A BURIED BOMB.

1. Recent experiments show that when a shaft is excavated to gain access to a bomb, and the bomb explodes at the bottom of the shaft, there is appreciably less earth shock and earth movement than if the same bomb had exploded before the excavation was made. Further a smaller crater would result. On the other hand, damage by blast will probably be greater where a shaft has been excavated.

In cases where it is vitally important to diminish earth shock and movement, *e.g.*, railway lines, bridges, dams, important gas and water mains and foundations, and where the effect of blast would not be serious, it is advantageous to excavate an 8 ft. by 4 ft. shaft down to the bomb at once (Fig. 3).

In some cases it is advantageous to direct the force of explosion away from the structure it is desired to protect. This can be done by excavating a trench about 12 ft. by 4 ft. as shown in Figure 4. If the bomb then explodes before it can be dealt with by a bomb disposal unit, the minimum damage will be done to the structure.

In deciding to use the methods described in this section, the damage likely to be done by blast, chiefly to windows and roofs, must be balanced against that likely to be done to foundations, cellars, etc.

In such cases, digging should only be done by I. E. Units or under I. E. supervision, except in cases of extreme urgency.

No. A. R. P. 30—41-42, *dated* 18*th June* 1943.

Copies to all recepients of the Pamphlet on Bomb Disposal Organisation.

A. A. KHAN,
Inspector-General of Police.

WD 6410—GPB—200—16-7-43

PROTECTIVE TRENCHING AND SAND-BAGGING

FIGURE 1.

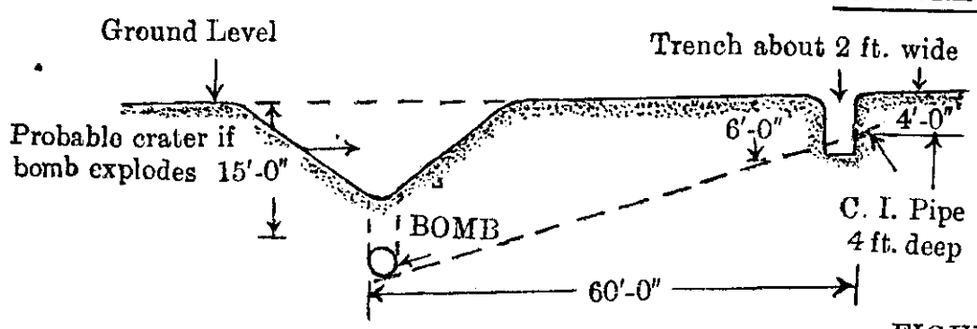


FIGURE 2.

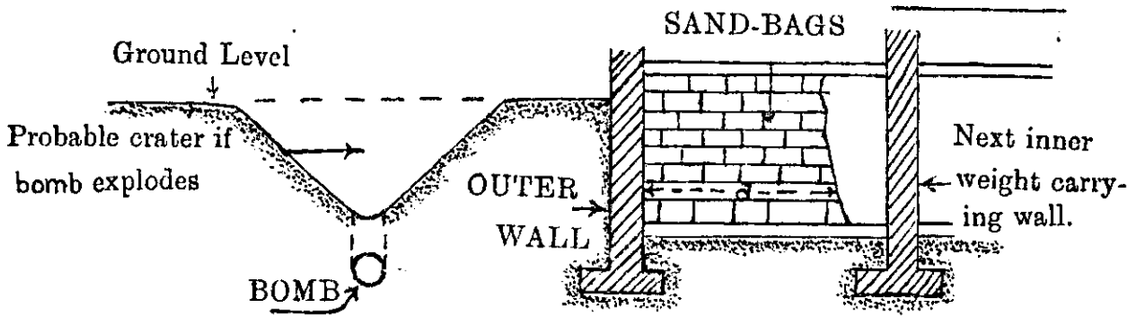


FIGURE 3.

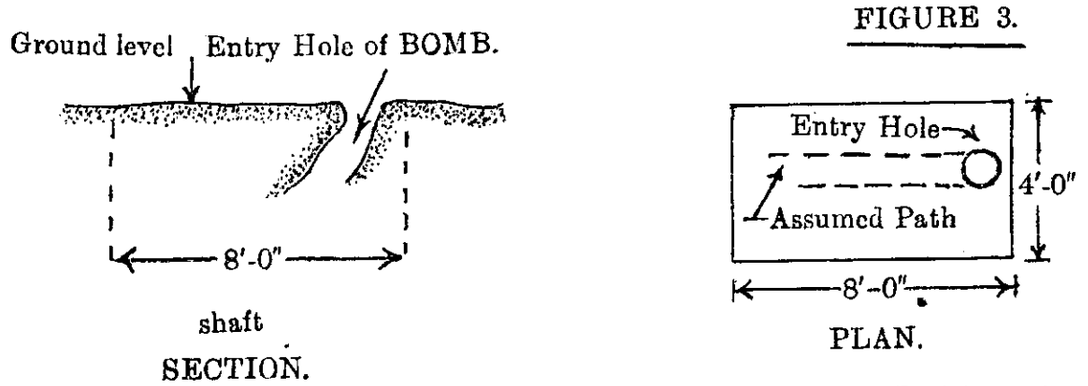
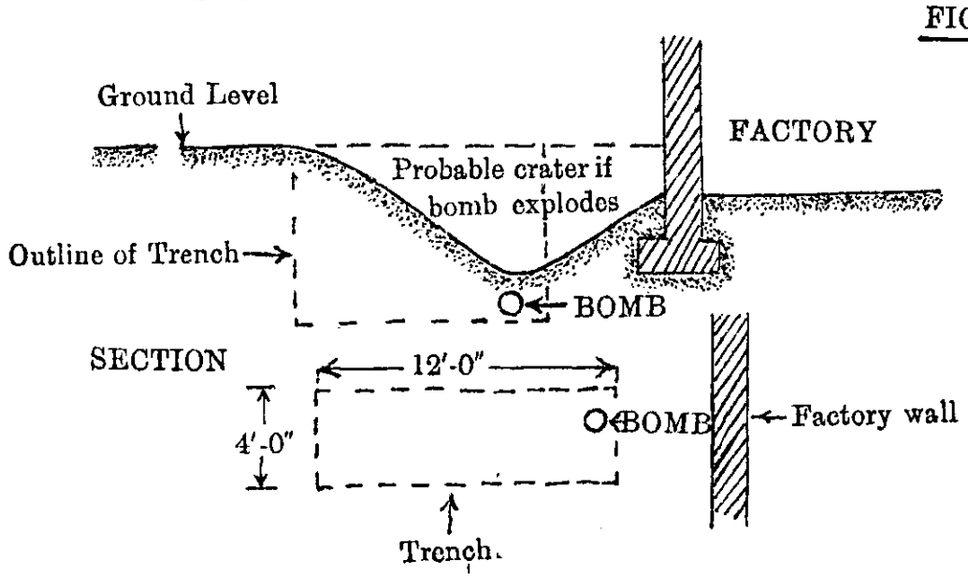


FIGURE 4.



PLAN

280 SECRET

OFFICE OF THE HON'BLE THE RESIDENT
IN MYSORE.

Bangalore 30th July 1943

No.F.3(24)-42/W. W.210-42-12.

A copy of the undermentioned paper is forwarded to the

Chief Secretary to the
Government of His Highness
the Maharaja of Mysore,
Bangalore,

for information, in continuation of endorsement from this Residency No. F.3(24)-42/W, dated the 12th June 1943.

CHIEF SECRETARY * 31 JUL 1943 * GOVT. OF MYSORE.

By order, etc.,

for SECRETARY TO THE RESIDENT

- - - - -

The Government of India (Civil Defence Department) Circular No. 594/43, dated the 8th July 1943.

MAP.

Appendix F G—1]

SUBJECT ..... Unauthorised Leave .....

.....

.....

Section War

File No. 210-42

Serial No. 13

Diary No. of letter replied to.....

No. W. 197/5-8-43
Encl/one.

To

The D. G. P.

General and Revenue Secretariat

( )

the *19*

Sir,

Date of issue 5.8.43.

In continuation of this office letter No 4430/W dt 16-6-43 on the above subject, I am directed to forward for needful action copy of Govt. of India (E. D. D. 60) Circular No 594/43 dt 2-7-43.

Signed by W/ K.V.

I have etc

List of enclosures .....

Copied by .....

Examined by .....

For Chief Secy

WD 086—GPB—40,000—30-7-40

Sd.

C. F. No. 46]

W·210-42-14

GOVERNMENT OF MYSORE

411/20.

Telegram / phone

OFFICE OF
the Inspector-General of Police
in Mysore,
Bangalore.

No. ARP.30/41-42.
Encls.

Date August 10, 1943.

To
The Chief Secretary
to the Government of Mysore,
Bangalore.

War

CHI
12. AUG. 19
Sir,
OF W

Unexploded Bombs.

With reference to your letter No.W.197 dated the 5th August 1943, I have the honour to request that the Superintendent, Government Press, may kindly be authorised to print and supply early 300 copies of the enclosure to the above letter for distribution to all concerned. The matter to be printed will be sent to the Superintendent, Government Press, direct for necessary action.

I have the honour to be,
Sir,
Your most obedient servant,

INSPECTOR GENERAL OF POLICE.

72

Appendix F. G.—1]

SUBJECT.....

.....

.....

Diary No. of letter replied to.....

General and Revenue Secretariat

( )

the *194* .

Date of issue... 13-8-43

Signed by.... M S.K.V

List of enclosures.....

Copied by.....

Examined by.....

Section W.

File No. 210-42

Serial No. 15

No. D 296/13-8-43

To

The Supdt, Govt Printing,
Bangalore.

Sir,

Unexploded Bombs. etc.

I am directed to request you kindly to print & supply 300 copies of Govt of India (C. D. Dept) circular No. 594/43 dt 8.7.43 to the I. G. P. who will send you the printing matter direct.

I have etc.

Memo no. D 297/13-8-43 for 13/8

for Chief Secy to Govt.

Copy to I. G. P. with refce to his letter No. AAP 30/41-42 dt 10-8-43

WD 04161—GPB—60,000—24-10-41

W.210-42-16. 485/W

No.F.3(24)-42/W. SECRET.

From

The Secretary to the Hon'ble
the Resident in Mysore.

To. The Chief Secretary to the
Government of His Highness
the Maharaja of Mysore,
Bangalore.

Bangalore, the/8 August 1943.

Arrangements made by the Madras Government for disposal of unexploded bombs.

- - - - -

Sir,

I am directed to refer to my letter No.F.3(24)-42/W, dated the 8th April 1943, and to forward for information a copy of the proceedings of the Government of Madras No.3531 Public (C.D.), dated the 2nd November 1942, together with the amendments issued thereto, on the subject cited above.

I have the honour to be,
Sir,
Your most obedient servant,

SECRETARY TO THE RESIDENT.

Appendix F. G.—1]

SUBJECT Arrangements made by the Madras Govt for disposal of unexploded bombs.

Section War

File No. 210-42

Serial No. 14.

Diary No. of letter replied to 485/W

No. W. 384. Encls.

General and Revenue Secretariat

( )

the *194* .

To

The I.G.P.

Sir,

35

In continuation of this office letter No. 3938/W dt 13.4.43, I am directed to forward for information a copy of the proceedings of the Govt of Madras No 3531 Public (C.D.) dt 2.11.42, together with the amendments issued thereto, on the above subject, ~~Since received from the Resy.~~

I have etc.,

for Chief Secy to Govt.

21/8.

Date of issue 24.8.43

Signed by M.S. AK.V

List of enclosures

Codied by

Examined by

WD 04161—GPB—60,000—24-10-41

No. 165/42-A.R.P. (C.D.).
GOVERNMENT OF INDIA
CIVIL DEFENCE DEPARTMENT
New Delhi, the 31st July, 1943.

From

R. A. GOPALASWAMI, Esquire, I.C.S.,
Joint Secretary to the Government of India.

To

All Provincial Governments.
Chief Commissioners.

CIVIL DEFENCE DEPARTMENT CIRCULAR No. 599/43.

Subject :—UNEXPLODED BOMBS.

Sir,

Reference Civil Defence Department Circular No. 594/43, dated the 8th July, 1943, the following amendment to the note on 'Protective Work' appended thereto may kindly be made.

In the penultimate line of para. 3 *for* 'R.A.E.' *read* 'R.E.' (Royal Engineers) or 'I.E.' (Indian Engineers).

I have the honour to be,
Sir,
Your most obedient servant,
Sd. R. A. GOPALASWAMI,
Joint Secretary to the Government of India.

No. 165/42-A.R.P. (C.D.).

A copy is forwarded to all Departments of the Government of India, Air Headquarters, E-in-C's Branch, Naval Headquarters, the Chief Secretary to the Government of Ceylon, Area Adviser, Commandants of Civil Defence Schools/College, General Headquarters (G.S. Branch, S.D. Signals), General Headquarters (G.S. Branch, M.O. 3), General Headquarters (G.S. Branch, G.S.I.T.), General Headquarters (G.S. Branch S.D. Air), Air Headquarters (Air Intelligence Section), Air Headquarters (Armt. 5 F/Lt. Uphill) and Headquarters 10th U.S. Air Force (Major Wildrick) for information.

By order,
Sd. R.A. GOPALASWAMI,
Joint Secretary to the Government of India.

Model Press, Delhi—235 copies 28-7-43.

W 210-42-18.

543
W

OFFICE OF THE HON'BLE THE RESIDENT IN MYSORE.
Bangalore, 27 August 1942.

No.F.3(24)-42/W.

Copy forwarded to the Chief Secretary to the Government of His Highness the Maharaja of Mysore, Bangalore, for information in confirmation of endorsement from this Residency No.F.3(24)-42/W. dated the 20th July 1942.

X

for SECRETARY TO THE RESIDENT.

ns

GOVERNMENT OF HIS HIGHNESS THE MAHARAJA OF MYSORE

General and Revenue Secretariat

No. W.450. W 210-42-19. *Bangalore dated,* 31st August 1943.

FROM

The Chief Secretary to the Government of
His Highness the Maharaja of Mysore.

TO

The Inspector General of Police in Mysore,
Bangalore.

SIR,

Unexploded Bombs.

In continuation of this office letter 197/W. dated the 5th August 1943 on the above subject, I am directed to forward herewith a copy of Government of India Circular No.599/43 dated the 31st July 1943, since received from the Residency.

I have the honour to be
Sir,
Your most obedient servant,

For Chief Secretary to Government.

Copy of letter No.165/42-A.R.P.(C.D.) dated the 31st July 1943, from R.A.Gopalaswami,Esq., I.C.S., Joint Secy. to the Govt. of India, Civil Defence Department, to all Provincial Governments & Chief Commissioners.

CIVIL DEFENCE DEPARTMENT CIRCULAR NO.599/43.

Subject:- Unexploded Bombs.

Reference Civil Defence Department Circular No.594/43,

P.T.O.

dated the 8th July 1943, the following amendment to the note on 'Protective Work' appended thereto may kindly be made.

In the penultimate line of para 3 for 'R.A.E.' read 'R.E.'(Royal Engineers) or 'I.E.' (Indian Engineers)

"Copy"

UNEXPLODED BOMBS.

Reference No. A. R. P. 30—41-42, dated 18th June 1943.

The following will be substituted for Sections A, B, C and D of the note on 'Protective Work'.

PROTECTIVE WORK.

A.—GENERAL.

1. Unexploded bombs may fall in places where their explosion would cause great damage to important buildings, fortifications or installations. Such bombs cannot always be dealt with at once by bomb disposal units, but certain precautionary measures can be taken immediately the bomb falls with a view to minimizing the damage should explosion take place. These measures consist of:—

(i) Preventive trenching, to minimise damage to foundations, buried pipes, etc.
(ii) Packing basements with sandbags.
(iii) Sandbag walling.
(iv) Digging down to bomb to form vent (as stated in Sec. F. this should only be done under expert supervision).

It is most important that any work carried out by units other than R. A. E. shall not hinder the work of the ultimate disposal of the bomb.

In this connection it is necessary carefully to note and mark the path of the bomb as the digging proceeds.

In digging down to a bomb great care must be taken not to move it, strike it, or subject it to a vibration or put pressure upon the nose or tail ends. The final uncovering of the bomb should be left to the bomb disposal unit (if it is intended to destory the bomb *in situ*., only sufficient of the bomb body should be uncovered to enable replacement of the explosive charge).

2. Although unexploded bombs include both "duds" and time bombs, it must be assumed that ever buried bomb of 50 kg. or over may be fitted with a time fuze.

As statistics of German bombs, show that about 8·5 per cent only of all unexploded bombs are self-detonating and the average risk of accident to any one man working continuously for eight hours near buried bomb at any time within 80 hours after the bomb fell is about one in a hundred and twenty. (As statistics have not yet been compiled in respect of Japanese bombs.)

In view of this risk work over or near any unexploded bomb should not be started until 125 hours (present safety period for Japanese Bombs) after it has fallen unless the probable damage due to an explosion *in situ* would appreciably retard the war effort. When it is essential to start work at once, only the minimum number of men required to carry it out should be allowed in the danger area at any one time.

3. Protective sandbagging requires large numbers of sandbags. It is wasteful to keep many sandbags ready filled owing to their tendency to rot; (Local Commanders would determine the necessity and numbers which should be kept ready filled as a guide about 2,000 2,000 would be a suitable quantity kept ready filled under cover).

Alternatively free sand may be brought up in lorries.

Some of the methods advocated below involve estimating the depth of the bomb. This should be done as soon as possible, before the hole has caved in. If the hole has caved in, it should be possible by probing flexible rods such as drain rods to assess whether the depth is over or under 10 ft. Probing by other than experienced R. A. E. personnel MUST NOT be attempted in the case of Japanese bombs.

B.—PROTECTIVE TRENCHES.

Table I shows the distances within which pipes, cables, foundations, etc., are liable to damage from explosion of a buried bomb.

Table I.—Distances within which damage is liable to be done.

Bomb	Cast-iron main, concrete or earthenware sewers	Earthenware or brick sewers	Electric cables, steel pipes	Foundation
50-60 kg.	26 ft.	40 ft.	20 ft.	50 ft.
100 kg.	...	...	...	...
250 kg.	40 ft.	65 ft.	30 ft.	100 ft.
500 kg.	50 ft.	80 ft.	35 ft.	150 ft.
1,000 kg. & over	65 ft.	120 ft.	50 ft.	250 ft.

If a buried bomb is within the above distances of vulnerable objects damages can be minimized by digging a trench about 2 ft. wide 2 feet deeper than, and as near possible to the object to be protected. Thus, a cast-iron pipe (Fig. 1) buried 4 ft., below surface 60 ft. from a 250 kg. bomb

buried 15 ft., would be protected by a trench 6 ft., deep. Such trenches need only be of the minimum width required for excavation (about 2 ft.) and should not exceed 6 ft. depth. Trenches should not be dug in ground which will not remain in repose unrevetted as digging proceeds.

Owing to the size of the crater made by explosion of the bomb, no protection could be given by a trench within 10 ft., of a 50-60 kg. ; 12 ft. of a 100 kg. bomb 20 ft. of a 250 kg. bomb and 30 ft. of a 500 kg. bomb.

C.—Sandbag Abutments.

The packing of basements, cellars, etc., with sandbags to avoid damage to foundations and walls may be useful in cases where the bomb is so near the building or the foundations are so deep that the depth of the protective trench required would be prohibitive.

The method consists of packing sandbags into the internal space against the outer wall so as to support it against the explosion (Fig. 2). It is not possible to lay down the depth (d) to which sandbags behind the wall should extend, but generally speaking the tighter they are packed, and the deeper the pile, the more effective will be the support. In practice a depth of 10 ft. will probably be effective, but the sandbags should not extend as far as an internal weight-carrying wall or bear against an internal column for fear of damage by thrust due to explosion.

2. Another method of minimizing damage to foundations is given in Sec. F. which in certain cases, can with advantage be combined with the above method.

D.—Sandbag Walls.

1. The building of sandbag walls to minimize damage from splinters, blast, etc., is applicable in the case of a bomb buried or on the surface close to a building. If may also be used to isolate the effects of a bomb inside a building.

The basic principle is that the wall must be built just outside the crater which would be formed if the buried bomb exploded. For practical purposes suitable radii from the hole of entry are shown in Table II—

Table II.—

10 ft. from a 50-kg. bomb
12 ft. from a 100-kg. bomb
20 ft. from a 250-kg. bomb
30 ft. from a 500-kg. bomb

} These figures make an allowance for the fact that the path of a bomb in earth is not straight.

2. The circumstances in which it is desirable to build a sandbag wall are as follows :—

(i) Bombs falling in open ground usually penetrate at least to the depth given in Table III. In such cases there are no serious splinter effects, and there should be no danger due to falling debris outside the area given in Table III.

The effect of blast, however, may still be very serious, and can be deflected upwards by a sandbag wall built outside the crater area. (Table II).

Table III.—

Size of bomb	Depth of penetration	Area (approx.) to which dangerous debris is confined
50-60 kg.	10 ft.	Circle 30 ft. radius from bomb
100 kg.	12 ft.	Circle 35 ft. ,, ,, ,,
250 kg.	15 ft.	Circle 50 ft. ,, ,, ,,
500 kg.	20 ft.	Circle 75 ft. ,, ,, ,,

(ii) At distances greater than those given for foundations, in Table I, little or no structural damage to buildings is to be expected from a buried bomb.

In the case of an unburied bomb damage will be limited to windows and roof if a sandbag wall is provided.

3. The following points should be noted in the construction of sandbag walls :—

(i) Walls should invariably be 2 ft. 6 in. thick at the top and preferably 10 ft. high. Open faces should be sloped at 1/6. This involves a base wider than 2 ft. 6 in. (say 4 ft. 2 in.)

(ii) Walls must not be built nearer to the bomb than the distances given in Table II.

(iii) Bonded walling (preferably English Bond) gives maximum strength.

(iv) In circular walling, ensure that the bond is unbroken intervals.

No. A. R. P. 30—41-42, *dated* 11*th August* 1943.

Copies to all recipients of the pamphlet on Bomb Disposal Organization.

A. A. Khan,
Inspector-General of Police.

WD 218—GPB—300—18-8-43

BOMB DISPOSAL ORGANISATION.

BOMB DISPOSAL ORGANISATION.

Details of the Bomb Disposal Organisation and the procedure to be adopted in connection with unexploded bombs.

(*Note.*—The term "Bomb" in this letter includes incendiary bombs 1-Kg, 50-Kg, 250-Kg, or more, Parachute Mines, H. E. Bombs 50-Kg—1000-Kg or more, Aeroplane Cannon Shells and Anti-aircraft shells.)

1. The Government of India have decided that—

(*a*) the preliminary reconnaissance and confirmation of the location and the existence of unexploded bombs is the responsibility of the Civil Defence and A.R.P. Organisation except in Military Cantonments where it is the responsibility of the Military Authorities, and within Railway premises where it is the responsibility of the Railway Authorities;

(*b*) the Civil Defence Commissioner is responsible for deciding the priority of disposal of unexploded bombs whether they are in Military Cantonments or in Civil Areas. In the case of several Civil Defence Commissioners having at call a single Bomb Disposal Section, the senior as authorised by the Provincial Government will allot final priority for disposal: and

(*c*) the final disposal of unexploded bombs is the responsibility of Bomb Disposal Sections organised by the Military Authorities.

2. Civil Defence Commissioners whilst being responsible for deciding priority of disposal of unexploded bombs will not normally themselves order a Bomb Disposal Section to take action but will do this through a Military Liaison Officer whom the Military Authorities are arranging to be at his headquarters during raid periods.

3. It is possible that unexploded bombs may fall in areas where there is no Civil Defence or A. R. P. Organisation. In such cases, the District Magistrate will be made responsible for reporting their existence to the nearest Civil Defence Commissioner who will then take the necessary action.

4. The following Appendices are attached:—

Appendix "A"—Procedure for dealing with unexploded bombs.

Appendix "B"—Form of Report on unexploded bombs.

Appendix "C"—Clearance of Danger Areas.

Appendix "D"—Notes on how to detect unexploded High Explosive Bombs.

Appendix "E"—Description of certain types of Bombs and precautions to be taken when handling them.

5. The recognition of unexploded bombs is not always easy and it will be necessary to train the Civic Guards, Police and A. R. P. Wardens and Wardens of Railways and Factories so that they will be able to undertake the "preliminary reconnaissance." (*See* Appendix "A", paragraph 1.) In addition a number of volunteers must be specially trained to carry out the duty of "Confirmation" (*See* Appendix "A", paragraph 4). These volunteers may be drawn from the authorised establishment of A. R. P. Volunteers but normally will be found from existing Government servants. The Public Works Department personnel will probably be found suitable for this duty.

APPENDIX 'A.'

PROCEDURE FOR DEALING WITH UNEXPLODED BOMBS.

(NOTE.—The term unexploded bombs in this Appendix include Parachute Mines, High Explosive Bombs, 50-Kg. and 250-Kg. Incendiary Bombs.)

Preliminary Reconnaissance.

1. As soon as it is suspected that a bomb has fallen in a particular locality and not exploded, the Police, Civic Guards and A. R. P. Wardens should search for its exact location, and decide whether the bomb has exploded or not (*See* Appendix 'D'). The exact spot should be marked.

Report on Preliminary Reconnaissance.

2. If it is decided that the bomb is unexploded or there is doubt, an immediate report stating the exact location of the bomb and whether it is buried or on the surface (*See* Appendix 'C', paragraphs 2 and 3) should be made to the Control Centre. The A. R. P. Controller will immediately inform the appropriate Police Headquarters. He will also inform Heads of the public utility services likely to be concerned, *e.g.*, railways, gas, water, electricity, sewers, etc., of the position of an unexploded bomb so that appropriate safety measures, such as cutting off supply, etc., can be taken by them against the possible premature explosion of the bomb.

Action by Police.

3. The Police will then decide whether it is necessary to clear an area and divert traffic and will take steps to give effect to the decision. (*See* Appendix 'C'.) A. R. P. Services on the spot should be warned of the presence of an unexploded bomb but should not be prevented from continuing with the work of rescue and attending to casualties.

Roads which have been closed on account of the presence of an unexploded bomb may still have to be used for military traffic or by fire fighting appliances or other Civil Defence and A. R. P. Vehicles engaged on essential work.

When roads have been closed and traffic diverted, the Police will inform the Civil Defence Commissioner of the extent of the dislocation and the degree of urgency in restoring normal conditions so that he may have guidance when deciding the order of priority for dealing with unexploded bombs. The A. R. P. Controller will also be informed so that he may communicate the fact that certain roads are blocked, to the A. R. P. Services.

Where houses have to be cleared, particularly at night, the inhabitants should be allowed time to take an adequate supply of clothing.

Confirmation.

4. As soon as possible after receipt of the immediate report mentioned in paragraph 2, the A. R. P. Controller will send personnel specially trained in the recognition of unexploded bombs, hereafter called Bomb Reconnaissance Party, to confirm whether an unexploded bomb does in fact exist and to make a report on a special form (*See* Appendix 'B'). Only the minimum number of Bomb Reconnaissance personnel necessary for the task should be despatched on this dangerous duty.

Action on receipt of definite information that a previously reported unexploded bomb does not exist or has been rendered harmless.

5. If the A. R. P. Controller is informed by the Bomb Reconnaissance Party or a Bomb Disposal Section that the bomb previously reported as unexploded does not in fact exist or has actually exploded or has been disposed of, he will inform immediately—

(i) *The Police*, so that persons who have been evacuated from their home may return and any restrictions imposed in the area may be withdrawn; and

(ii) *The heads of the public utility services*, who were previously warned (*See* paragraph 2 above).

The Police will inform the Civil Defence Commissioner and the A. R. P. Controller when the roads previously reported closed (*See* paragraph 3 above) have been reopened and restrictions removed.

Action by the A.R.P. Controller when the presence of unexploded Bombs is confirmed.

6. This action will *not* be taken unless the A. R. P. Controller has received the confirmatory report from the Bomb Reconnaissance Party.

If the presence of unexploded bombs is confirmed by the Bomb Reconnaissance Party, he will immediately inform the Civil Defence Commissioner passing to him a copy of the Bomb Reconnaissance Party's reports in duplicate with any facts which he thinks will assist the Civil Defence Commissioner to decide on priority of treatment. He will state the address of the nearest Warden's Post to the bomb.

Action by the Civil Defence Commissioner on Receipt of confirmed Information of the Presence of unexploded Bombs.

7. (i) If in the opinion of the Civil Defence Commissioner a bomb should be disposed of at once, he will give the necessary orders to the Bomb Disposal Section through the Military Liaison Officer at his Headquarters. In making this decision he should remember that within 80 hours of the fall of a bomb it must be considered to be a time bomb and that it may explode at any moment. His decision therefore may affect the lives of the Bomb Disposal Section personnel.

(ii) In respect of unexploded bombs which do not require to be dealth with at once, the Civil Defence Commissioner will at 06·00 hours each day give to the Military Liaison Officer at his Headquarters for communication to Bomb Disposal Sections a list of all unexploded bombs not yet dealt with, arranged in order of priority as follows:—

A. Those requiring immediate treatment as affecting important national or Provincial Services;

B. Those urgent for local reasons; and

C. Others.

The Civil Defence Commissioner should assign a high priority for the disposal of 'unburied' bombs (for definition *see* Appendix 'C', paragraph 2). The reason for this is that their splinter and blast effects are more marked than in the case of 'buried' bombs, and when they are found comparatively large, clearance areas have to be evacuated. He should normally assign a high degree of priority to unexploded bombs on railway premises.

A copy of this list will be sent to the Commissioner for his information and onward transmission to the Government.

Form of List of Unexploded Bombs

Date of fall of bomb	Time (when known)	Place	Priority (A., B. or C.)

The Civil Defence Commissioner will also give to the Liaison Officer in duplicate a separate card for each bomb giving a clear description of the spot at

which the bomb lies and the name of the A. R. P. Controller and his telephone number (*See* paragraph 8 below).

Form of Card.

1. A. R. P. Controller..... ... Telephone No.....
2. Exact place at which bomb lies.
3. Address of nearest Warden's Post.
4. Report of Bomb Disposal Section.

Date..... Signature..... .....

O. C. No..... Bomb Disposal Section.

In the case of several Civil Defence Commissioners having at call a single Bomb Disposal Section, the senior, as authorised by the Government, will allot final priority for disposal; they therefore submit their list of reports of unexploded bombs to the Senior Civil Defence Commissioner and not to the Military Liaison Officer.

Action by Bomb Disposal Sections on receipt of instructions to dispose of unexploded bombs.

8. The following instructions are being issued to Officers Commanding Bomb Disposal Units by the Military Authorities:—

(i) Unexploded bombs will be dealt with in the order of priority given on the list supplied by the Civil Defence Commissioner.

(ii) The Officer Commanding a Bomb Disposal Section will inform the A. R. P. Controller when he is about to deal with an unexploded bomb.

(iii) The Officer Commanding a section will inform the A. R. P. Controller when any bomb has been dealt with or found harmless. In order that this information may be conveyed in a form which leaves no doubt of its authenticity, a separate card for each bomb giving a clear description of the spot at which the bomb lies and the name of the A. R. P. Controller will be supplied by the Civil Defence Commissioner with the daily list. (For form *see* paragraph 7 above.) The Officer or N. C. O. in charge, of the Bomb Disposal Section present, after he has dealt with a bomb or found it to be harmless, will note the fact on the appropriate card, and hand one copy of it to the nearest A. R. P. Warden's Post. The Warden in charge will at once inform the Controller by telephone.

If an unexploded bomb has fallen in railway premises, the Officer or N. C. O. in charge of the Bomb Disposal Section will hand the card to the nearest Railway A. R. P. Warden's Post and NOT to the Civil A. R. P. Warden's Post. The Warden in charge will at once inform his Control Centre, which will in turn immediately inform the A. R. P. Controller by telephone.

Action by the A. R. P. Controller on receipt of information that an unexploded bomb is about to be dealt with by a Bomb Disposal Section.

9. The A. R. P. Controller will arrange for the Bomb Disposal Section to be guided to the spot and for the presence of representatives of any public utility affected by the operations (*e.g.*, railways, gas, water, electricty, sewage, etc.) He will inform the railway authorities when a Bomb Disposal Section is about to deal with an unexploded bomb within railway premises in order that necessary precautions may be taken. He will render any assistance in his power to the Bomb Disposal Section.

Unexploded Bombs on Railways or in Railway Workshops.

10. Railways will report unexploded bombs to the A. R. P. Controller stating the priority in which they should be dealt and any information which will guide the civil Defence Commissioner in deciding on relative priority of disposal to be assigned to those on railway property and other places. They will also give the

address and telephone number of the railway representative with whom the Bomb Reconnaissance Party (if required by the railway authorities) and the Officer Commanding the Bomb Disposal Section should get in touch. This information will be passed on to the Civil Defence Commissioner who will in turn communicate it to the Military Liaison Officer at the headquarter.

11. All action noted herein to be taken by the Police, will, in the case of unexploded bombs being found on railway premises, be taken by the railway administrations. It will not normally be necessary for the Civil Police to enter railway premises for this purpose.

12. The Police, Civic Guards, A. R. P. Personnel and the General Public will report to the nearest railway official the fall of any bombs, whether unexploded or not, within railway premises.

Unexploded Bombs in Cantonments.

13. Instructions are being issued by the Military Authorities to the Officers concerned that reports of unexploded bombs which have been confirmed (*See* paragraph 4 above) are to be made to the Civil Defence Commissioner direct in the manner set forth in paragraph 6 above. Reports will state the relative priority with which the bombs should be dealt and information which will guide the Civil Defence Commissioner when deciding on the priority of disposal of all unexploded bombs in the area. Reports will also state to whom the Bomb Disposal Section should report in the Cantonment Area.

Unexploded Bombs in Factories.

14. Report should be made to the A. R. P. Controller through the nearest Warden's Post, for onward transmission to the A. R. P. Controller.

Unexploded 1Kg. Incendiary Bombs, Aeroplane Cannon Shells, Anti-Aircraft Shells.

15. It is the duty of A. R. P. Workers to collect these if lying on the surface and take them to a suitable dump which should be appointed by the Police. They will be disposed of by Bomb Disposal Sections as opportunity offers.

APPENDIX 'B'.

To.....

Copy to.....

Report on an Unexploded Bomb.

1. Exact location.....

2. Date and hour of falling.....

3. Say if in—(i) Open ground .....

(ii) Hard surface .....

(iii) Building .....

4. Is any part of the bomb exposed (give details).....

.....

5. Diameter of hole.....

6. Estimated depth of bomb.....

7. (i) Has a crater been formed ?.....

(ii) Are windows over 20 feet away broken ?.....

(iii) Have splinter or splinter marks been found ?.....

(iv) Is there any sign of blackening ?.....

8. Reasons for believing bomb NOT exploded and remarks.....

.....

.....

Signed.....

Designation.

Time of report.....

Date.....

DANGER AREAS.

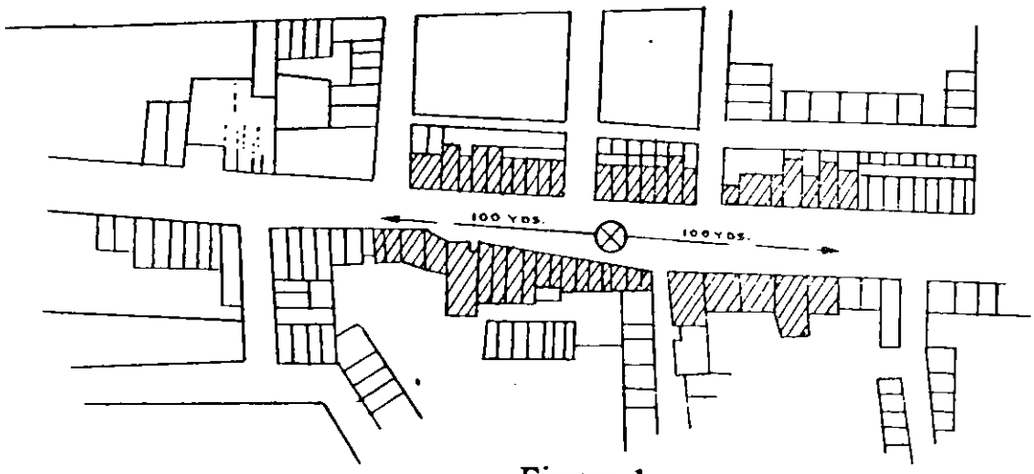


Figure 1.

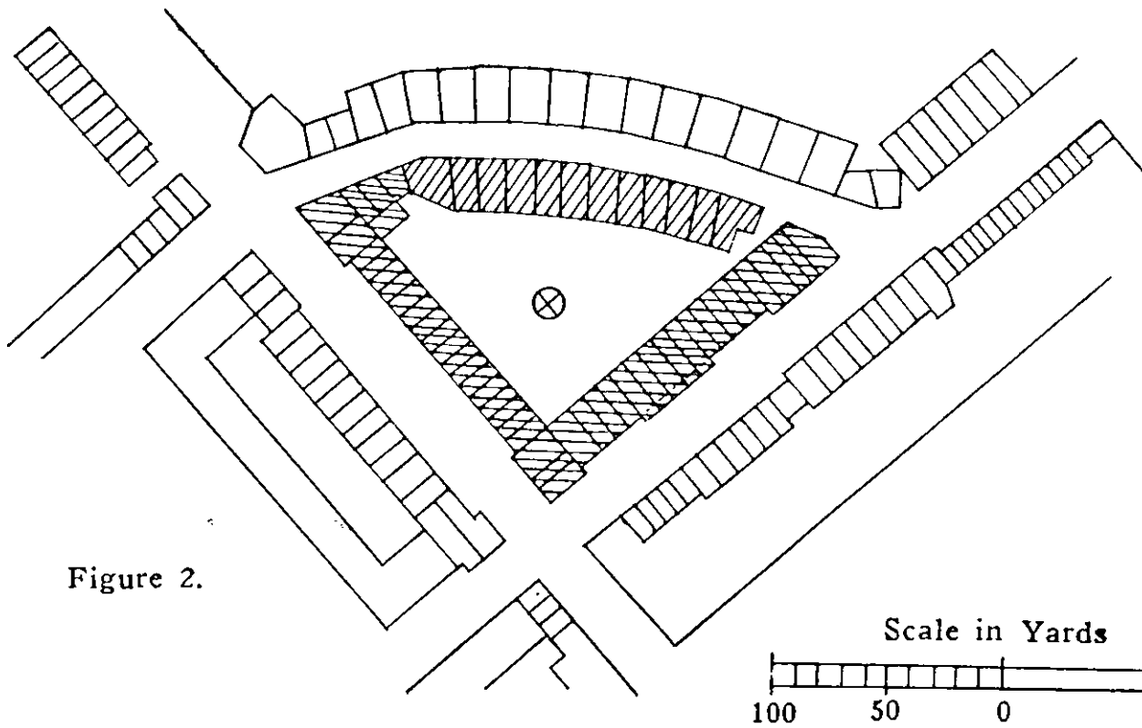
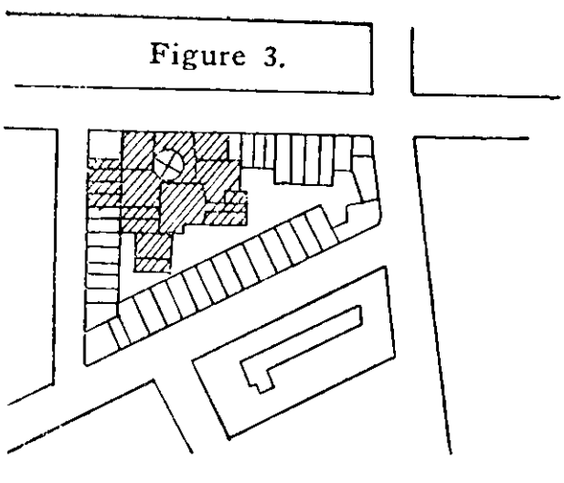


Figure 2.

Scale in Yards

100 50 0 100

Figure 3.



⊗ Position of Bombs

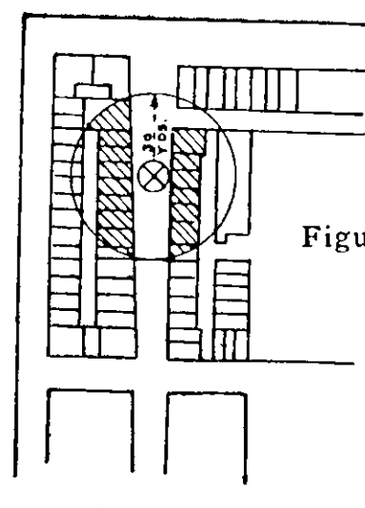


Figure 4.

Shaded Portions to be Cleared

APPENDIX 'C'.

Clearance of Danger Areas.

1. All buried unexploded bombs must be regarded as potential time bombs, which may explode up to 80 hours from the time they fell, until the contrary has been proved.

2. Unburied Bombs. —— Areas to be cleared.

(*a*) The definition of an 'Unburied Bomb' is a bomb which is either on the surface or

In the case of a	50-Kg.	buried to a depth of	2 feet.
Do	250-Kg.	do	4 ,,
Do	500-Kg.	do	6 ,,
Do	1000-Kg.	do	10 ,,

These depths refer to the body of the bomb and not to the tail fins.

(*b*) *Unburied bomb in the open.*—Circle of radious 300 yards should be cleared. This should be increased to 450 yards for bomb larger than 500-Kg.

(*c*) *Unburied bomb in a straight street* (*Fig.* 1)—(i) All buildings should be cleared entirely up to 30 yards from the bomb.

(ii) In buildings of three or more storeys, occupants should vacate rooms on all floors facing the bomb up to 100 yards on each side of the bomb. Occupants may, however, remain in rooms on the second or higher floor at the back of such buildings, *i.e.*, at the side remote from the bomb, where they are 30 yards away from the bomb.

(iii) One or two storey buildings should be entirely cleared up to 100 yards on each side of the bomb; and the front rooms (facing the bomb) should be vacated up to 200 yards on each side of the bomb.

(*d*) *Unburied bomb in small open spaces* (*Fig.* 2).—(i) All buildings should be cleared entirely up to 30 yards.

(ii) In buildings of three or more storeys, all rooms facing the bomb up to 200 yards should be vacated.

(iii) All buildings of one or two storeys should be cleared within 200 yards of the bomb; and rooms of all houses facing the bomb should be vacated. (Up to 300 yards should be sufficient.)

(*e*) *Bombs in buildings, narrow courts or alleys*, (*Fig* 3.)—All buildings should be cleared entirely up to 30 yards; as also should those exposed to the bomb without buildings intervening.

(*f*) *Unburied bombs larger than* 500-*Kg.*—A few bombs of 1000-Kg. have recently been found fitted with long delay fuzes.

When it has been ascertained that the bomb is larger than 500-Kg., it is advisable to clear all houses within a radius of 100 yards.

(*g*) *Period for clearance.*—The period during which clearance is enforced and the minimum restrictions of traffic for unburied bombs should, other things being equal, follow the rules laid down in paragraph 3 below for buried bombs.

It may, however, be necessary, in view of the risk due to splinters in the open within 300 yards of the bomb, further to restrict both Pedestrian and wheeled traffic.

3. Buried bombs. —— Areas to be cleared.

(*a*) The definition of a 'Buried Bomb' is a bomb which has penetrated deeper than the depth given in Paragraph 2 (*a*) above.

(*b*) *Buried Bombs.*—(i) All buildings within 30 yards of the bomb should be cleared (Fig. 4).

(ii) All windows within 100 yards of the bomb should be opened wide, to prevent destruction of the windows and injury to personnel due to fiying glass.

(iii) Outer doors of the evacuated buildings should also be opened wide.

(iv) No heavy wheeled traffic should be allowed within 100 yards of the bomb. Roads and approaches within that distance should be closed to heavy traffic.

(v) Pedestrian traffic should be confined to the occupants of unevacuated houses only. There is very definite risk to people walking within 30 yards of a buried bomb unless there is suitable cover, such as a house, between them and the bomb. If there is no such protection between the bomb and the front of the building, it is advisable to enter, where possible, by the back door.

(vi) In the case of a 250-Kg. bomb or larger, and subject to the proviso below, occupants may return to their buildings 96 hours after the bomb falls subject to the advice of the Bomb Disposal Officer. Heavy wheeled traffic may not, however, be resumed until the bomb has been finally disposed of.

Proviso.—If a railway (including an underground railway) passes within 100 yards of the bomb, the full restrictions must remain in force until the bomb is finally disposed of.

(vii) When the bomb disposal party arrives to dispose of the bomb, the area may have to be cleared for a limited period, which should not exceed the hours of daylight.

(viii) Every bomb may be a time bomb fitted with a fuze, which can be set to go off at any time. Furthermore, if the bomb is moved or subjected to vibration by passing traffic or a train, it may be detonated.

(*c*) *Bombs in buildings, narrow courts or alleys* (Fig. 3).—All buildings should be cleared entirely up to 30 yards; as also should those exposed to the bomb without buildings intervening.

(*d*) The above applies only to bombs up to and including 500-Kg. If the bomb is larger than 500-Kg. it is advisable to clear all houses within a radius of 100 yards.

4. Unexploded parachute mines—Areas to be cleared.

(i) All buildings within 400 yards should be cleared.

(ii) Roads within 400 yards should be roped off and all traffic stopped.

(iii) In the remaining houses up to 800 yards occupants should keep clear of glass.

(vi) All doors and windows should be kept wide open, up to 800 yards.

(v) *These restrictions should remain in force until the mine has been removed.*

5. Crashed Aircraft—Areas to be cleared.

The instructions in paragraph 2 above should also be followed in the case of crashed aircraft as they may have unexploded bombs in them.

6. Unexploded Anti-Aircraft Shells.

No special steps need be taken to clear the area. They do not often penetrate deeply, and should be dug up as occasion offers under supervision of Bomb Disposal Personnel, if necessary.

7. Isolation of Areas—Notice Boards.

Notice Boards bearing in English and the local Indian languages the words, "*Police Danger—Unexploded bomb*" and a large drawing of a bomb should be prepared on a scale of 50 boards for every 250,000 population or less.

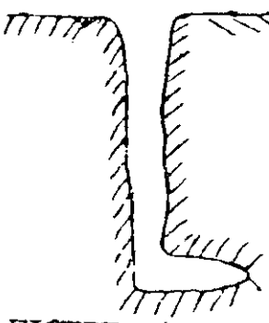


FIGURE 1.

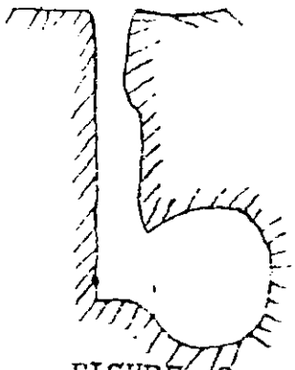


FIGURE 2.

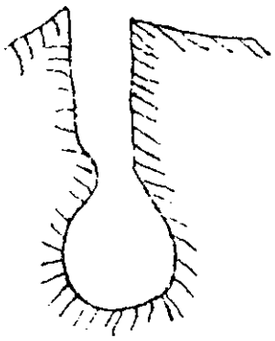


FIGURE 3.

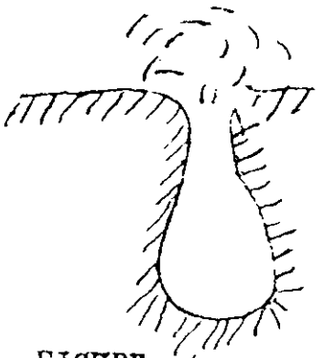


FIGURE 4.

FIGURE 5.

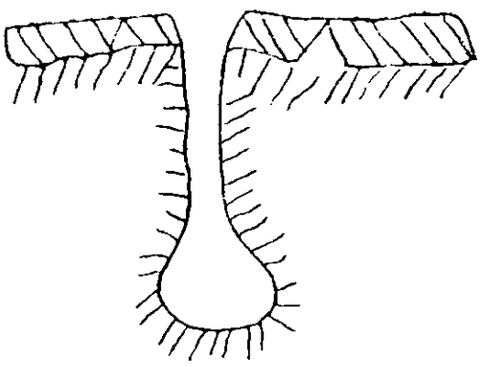


FIGURE 6.

FIGURE 7.

APPENDIX 'D'.

NOTES ON HOW TO DETECT UNEXPLODED HIGH EXPLOSIVE BOMBS.

1. Size of Hole.

(*a*) The entry hole is normally roughly circular.

(*b*) Holes under six-inch diameter are not made by bombs. If they are regular in shape they may have been made by anti-aircraft shells.

(*c*) Holes between eight inches and twelve inches indicate a 50-Kg. bomb.

Holes of 14 inches and 18 inches and sometimes more indicate a 250-Kg. bomb.

Holes of 18 inches and upwards indicate a 500-Kg. bomb or larger.

(*d*) Bombs of 1,000-Kg. or larger may form a crater as big as ten feet diameter and four feet deep. This is due to the shock of impact, not to explosion.

(*e*) Bombs of smaller calibre may form similar craters in which case it is necessary to scrape away the earth at the bottom of the crater so as to disclose the true hole of entry.

2. Depth to which Bomb Penetrates.

(*a*) This depends on :—

(i) The height from which dropped.

(ii) To some extent the weight of the bomb.

(iii) What the bomb hits before entering the grouud, and

(iv) Nature of the soil.

(*b*) Typical penetrations from high altitude attack are :—

In hard compact sand	....	....	8 feet.
In dry clay or chalk	....	....	15-20 feet.
In wet clay	....	...	25 feet.

If a bomb falls on a concrete floor or road, penetration is much reduced. One was found four feet below a concrete road.

3. Path of a Buried Bomb in the Ground.

The hole generally starts slanting slightly away from the vertical and continues straight for a distance of from 6 to 12 feet. It then jinks sideways so that the bomb may come to rest up to ten feet or even more from a vertical line through the entry hole. The most common case is shown in Figure 1.

The tail fins of the bomb are usually wrenched off during passage through the earth. A probing rod pushed down the hole will probably be stopped by the tail fins and cannot be relied on to give the accurate depth of the bomb.

4. How to tell if a Bomb has exploded.

(*a*) The following are infallible signs that a bomb has exploded :—

(i) Formation of a definite crater (Fig. 5) (but see paragraph 1 (*d*) and (*c*).

(ii) Presence of steel splinters in or around the place where the bomb falls.

(iii) Extensive breakage of windows up to and beyond 20 feet from the bomb.

(iv) Blackening of earth in bomb hole or crater.

(v) Characteristic smell of explosive gases.

(vi) Smoke by day; a flash by night.

(*b*) *Bombs which fall in open ground.*—Bombs from high altitude bombing which fall in open ground will often penetrate deeply before they explode, and in such cases form an underground cavity (camouflet) but leave little or no signs of surface disturbance. Sure signs of explosion in this case are :—

(i) The raising of the earth round the sides of the hole (Fig. 3) accompanied by blackening of the sides of the hole. The fact that the surface of the

ground round the hole may be disturbed does not in itself prove that the bomb has exploded, as sometimes a 'splash' of earth is thrown up when the bomb hits the ground.

If the bomb falls in a shallow stream or marshy ground, the 'splash' effect is often intensified. In the former case the presence of dead fish points to explosion.

(ii) The formation of a small mound which covers the hole (Fig. 5).

(iii) Cracking or displacement of neighbouring buildings, walls and trench linings. Persons in such buildings feel a violent shock.

If none of these signs are noted it is likely that the bomb has not exploded, but a very deeply buried bomb or one which has moved sideways before exploding (Fig. 1) may explode, forming an underground cavity without surface disturbance; or blackening of the hole (Fig. 2). Explosion in this case is very hard to detect.

(*c*) *Bombs falling on hard surface.*—Large bombs may penetrate concrete surfaces and reach a considerable depth before exploding. In this case effects will be similar to those in (*b*) above. The concrete will be very slightly raised round the edges of the hole and cracked (Fig. 6). In this case it is difficult to decide whether the bomb has exploded or not, unless blackening is present.

On the other hand a small bomb exploding on contact with a concrete surface may produce a very small crater (2 ft. to 3 ft. across) which may be mistaken for the entry hole of a larger (unexploded) bomb. This case can easily be distinguished by the presence of a cavity just under the concrete (Fig. 7), by the bevelling of the edges of the hole—by splinters in the crater and by splinter and blast effects in surrounding buildings.

(*d*) *Bombs in buildings.*—Considerable damage may be done by a bomb which strikes a building and yet does not explode. A considerable area of roof tiling may be displaced—walls and partitions cracked—glass broken, and even floors brought down. In such cases, however, the characteristic effects of blast, and splinters are absent.

Bombs which explode inside a building have the effect of bulging the walls outwards near the point of explosion, shattering internal partitions and glass and marking walls, etc., with splinters.

In one or two storeyed houses, sheds and factories, a bomb may penetrate deeply into the ground under the building before exploding. In this case the visible effects will be as in paragraph 4 (*b*), but explosion will be easily detected by the cracking of walls combined with the blackening of walls and ceilings.

APPENDIX 'E'.

DESCRIPTION OF CERTAIN TYPES OF BOMBS AND PRECAUTIONS TO BE TAKEN WHEN HANDLING THEM.

1. Parachute Mines.

Parachute mines vary in shape and size. They are roughly cylindrical, and may be up to 12 feet 3 inches in diameter, rounded at the front end, with an attachment for a parachute at the back. They are made of aluminium, often painted grey. The parachute, which may be 15 ft. in diameter when opened out, is usually made of green silk.

Parachute mines are liable to detonate magnetically or through vibration. To obviate the former risk, small steel or iron tools, shovels, hammers and steel helmets, etc., should not be brought within five yards of the mine.

The disposal of Parachute mines is the responsibility of Bomb Disposal Sections. *A. R. P. Personnel will leave them severely alone.*

2. Aeroplane Cannon Shells.

These are fired from aeroplanes and can be recognized from the diagram below. They must be handled with great care, as they explode if dropped or even jolted. *In no circumstances must the pointed end be touched.* They should be picked up by hand by the middle. Great care should be taken—

(*i*) to keep them horizontal;

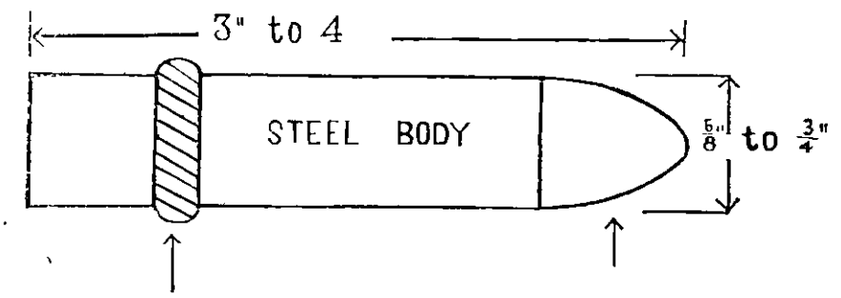
(*ii*) to avoid jolting or sudden change of direction;

(*iii*) above all, not to drop them.

For transporting, they should be placed in a basket or box, lined with cotton, wool, felt or other soft material. Only two shells should be carried in any one basket, and these should be separated by a wad of soft material.

An excavation 3 ft. by 1 ft. deep should be provided by the Police in a suitable place, not accessible to the public, for reception of the shells, and the top covered with sandbags. It is the duty of A. R. P. Personnel to carry cannon shell to the place appointed by the Police for their reception.

TYPICAL GERMAN CANNON SHELL FIRED FROM AEROPLANES.



COPPER DRIVING BAND

BRASS OR ALUMINIUM FUZE.

3. Anti-Aircraft Shells.

Anti-Aircraft Shells are of two main types—

(*i*) those of 4·5 inches to 3 inches diameter, which are comparatively safe to handle, and

(*ii*) those of 1·6 inches diameter which are usually *highly sensitive.*

Unexploded shells found on the surface should be removed at once by A. R. P. personnel to a suitable dump appointed by the Police.

They should be carried horizontally and not bumped, dropped or jerked.

If transported in a lorry, they should be deposited in sand-boxes (only one per

4. 1-Kg. Incendiary Bomb.

The small 1-Kg. type has a hollow cylindrical magnesium body filled with thermite, and a tail usually painted green.

Some of these bombs have a small bursting charge contained in a steel tube screwed into the back of the bomb, which explodes after the bomb has been alight for from one to two minutes.

Both types are harmless if carefully handled, and it is desirable to salve the magnesium of which they are made.

Their removal to suitable dumps appointed by the Police is the duty of all A. R. P. Personnel.

They should be picked up by hand, carried horizontally, and deposited outside buildings, whence they should be removed to a central dump later under arrangements made by the A. R. P. Controller.

They will be handed over at intervals to the nearest bomb disposal unit.

5. 50-Kg. Incendiary Bomb.

The 50-Kg. Incendiary Bomb looks like a 50-Kg. High Explosive Bomb, but is usually sprayed with aluminium paint.

Disposal is the responsibility of the Bomb Disposal Sections. *A. R. P. Personnel will not touch these bombs.*

6. 250-Kg. and 500-Kg. Incendiary Bomb.

The 250-Kg. and 500-Kg. Incendiary Bombs, usually referred to as "Oil Bombs" look like 250-Kg. and 500-Kg. High Explosive Bombs. They are filled with oil and have a bursting charge of about 2½ lbs. of high explosive.

Both 50-Kg. and 250-Kg. Incendiary Bombs must be treated with care, as they contain high explosive. They should only be moved by Bomb Disposal Units. *A. R. P. Personnel will not touch these bombs.*

BOMB DISPOSAL ORGANISATION—CRASHED AIRCRAFT

Details of the procedure to be followed in the case of crashed aircraft or aircraft which have made a forced landing. Generally the procedure will follow that set out in the previous instructions regarding unexploded bombs with the exceptions given below :—

General Instructions.

2. No part of an aircraft, its equipment or armament will in any circumstance be removed or interfered with, without the permission of Air Headquarters, India, except as indicated in Paragraphs 4, 6, 8, 15 and 17 below.

Action by Police, Civic Guards and A. R. P. Personnel on becoming aware that an Aircraft has crashed or made a forced landing.

3. An immediate report will be made to the A. R. P. Control and Report Centre concerned giving the following details :—

(*a*) exact location ;

(*b*) date and time of crash—forced landing ;

(*c*) type of aircraft (if recognised) ;

(*d*) whether hostile or friendly aircraft ;

(*e*) whether unexploded bombs suspected—known to be present ; and

(*f*) casualties.

In the case of railways, an immediate report will be made to the nearest A. R. P. Railway Control Officer, who, in turn, will immediately report, giving the details mentioned above, to the A. R. P. Control and Report Centre.

4. If the aircraft is on fire, an immediate report will be made to the Fire Brigade.

In the case of railways, an immediate report will be made to the Railway Fire Brigade, if any, or failing this, to the Civil Fire Brigade.

5. A guard will be posted by the senior present to prevent any unauthorised person interfering with the aircraft.

6. Every effort will be made to save the occupants of the aircraft and to render First Aid.

Action by A. R. P. Controller.

7. On receipt of the report, the A. R. P. Controller will immediately inform—

(i) *the Civil Defence Commissioner* giving the details mentioned in paragraph 3 and stating whether the unexploded bombs, if any, constitute a danger to any vital establishment ; and

(ii) *those mentioned in Paragraph 2* of Appendix ' A '.

8. The A. R. P. Controller will take any other action considered necessary to save life or property, but see paragraph 2 above.

9. He will take early action to confirm whether unexploded bombs do in fact exist and will report the result to the Civil Defence Commissioner.

Action by Police.

10. The Police will take action as in paragraph 3 and 11 of Appendix ' A '.

Action by the Civil Defence Commissioner.

11. He will immediately make a report to the nearest Air Force Station in the form given in the annexure provided it is not more than six hours' travelling distance by road or rail when he will make his report to Air Headquarters, India, New Delhi—Simla.

These reports must NOT be sent by wireless unless telegraphic and telephonic communications are not available in which case they may be sent by wireless in cypher signal, priority 'Important', by arrangement with the military authorities.

12. On receipt of the above reports—

(*a*) the Commander of the nearest Air Force Station (see paragraph 11) will report to Air Headquarters, India, and will arrange for a preliminary visual inspection.

(*b*) Air Headquarters, India, will decide whether the aircraft is to be examined by Air Force Technical personnel and if so will advise the Civil Defence Commissioner of the date and time of the inspection and ask for any local assistance which may be required. The Civil Defence Commissioner will arrange for the assistance and inform all those concerned, *e.g.*, Railway Authorities, Public Utilities, etc.

13. If no technical inspection is to be carried out, the Civil Defence Commissioner will be given instructions by Air Headquarters, India, for the disposal of the aircraft and its equipment.

14. He will in conjunction with the local military authorities, if any, otherwise the Police, arrange for a properly constituted guard to be posted over it.

15 In the event of a crash, when the presence of unexploded bombs has been confirmed and the Civil Defence Commissioner is of the opinion that they constitute a danger to vital installations, he will take action as in paragraph 7 (i) of Appendix 'A'.

16. In the event of a successful forced landing or when the unexploded bombs do not constitute a danger to vital installations he will take action as in paragraph 7 (ii) of Appendix 'A'.

It should be noted that Officers Commanding Bomb Disposal Sections are being given instructions to the effect that bombs on crashed enemy aircraft are to be removed *without defuzing* when at all possible. In cases where this is not possible, they are to be treated in the same manner as any other unexploded bombs on the surface, and the same safety precautions are to be observed.

Crashed, etc., Aircraft in Railway and Factory Premises.

17. The Railway Authorities and Factories will report the fall of crashed aircraft and aircraft which have made a forced landing, to the Report Centre in the manner set out in paragraph 3 above stating in addition whether unexploded bombs in the aircraft, if any, constitute a danger to any vital installation, or whether the aircraft interfere seriously with railway working.

The Railway authorities are permitted to remove crashed aircraft to the side of the line, using their own personnel, cranes or other equipment, but this must not be done until the aircraft has been made safe for handling.

Crashed, etc., Aircraft in Cantonments.

18. The military authorities will make the report mentioned in paragraph 7 above to the Civil Defence Commissioner stating in addition whether the unexploded bombs in the aircraft, if any, constitute a danger to any vital installation.

ANNEXURE.

Report of Crashed or Forced Landed Enemy Aircraft.

1. Exact location.
2. Date and time of crash/forced landing.
3. Type of aircraft (if recognised).
4. Extent of damage to aircraft.
5. Whether unexploded bombs on aircraft.
6. Whether bombs disposed of as danger to vital establishment.

WD 3548—GPB—300—4-2-42